

**Statement of  
Patricia Fry Godley  
Assistant Secretary for Fossil Energy  
U.S. Department of Energy  
before the  
Subcommittee on the Interior and Related Agencies  
Committee on Appropriations  
U.S. House of Representatives**

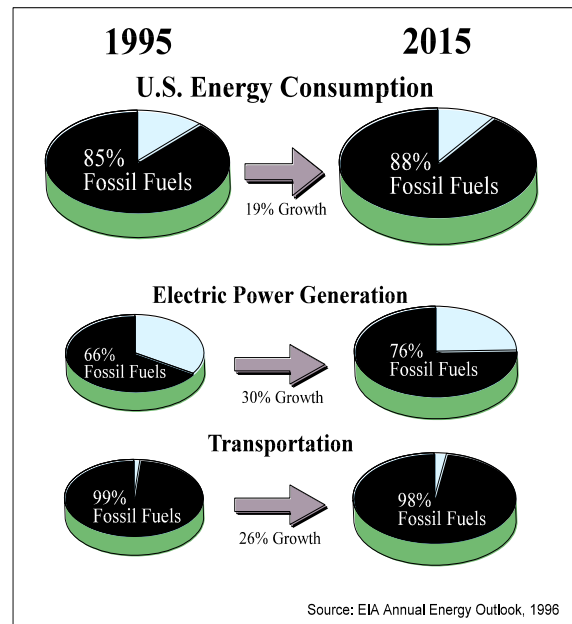
**The FY 1997 Fossil Energy Budget  
MEETING OUR COMMITMENTS**

Our FY 1997 Fossil Energy budget is based on the necessity of fossil fuels to our economy and economies of virtually every country around the globe. Today 85% of our domestic energy consumption is supplied by fossil fuels; by 2015, the contribution of fossil fuels will grow to 88%. Every credible energy expert believes that the foreseeable national and global energy future, like the present, will be shaped predominantly by fossil energy.

Our vision is that the benefits of fossil energy use – affordable prices, a stronger economy, greater employment, and a contribution toward improved global prosperity – can be realized at the same time we dramatically improve our environment. Moreover, we believe that the Federal Government has a major role – indeed a responsibility – in making that vision a reality.

At the same time, we remain cognizant of our commitments to fiscal stewardship. Our FY 1997 budget contains sharp reductions in the Clean Coal Technology Program, which we believe can be achieved without compromising our cost-sharing obligations to our private sector partners. It also includes a reduction in our Research and Development Program, reflecting the completion of some programs, fewer research contractors in others, and overall management savings achieved by restructuring the Office of Fossil Energy organization. It maintains a minimum level of activity at the Naval Petroleum and Oil Shale Reserves while privatization initiatives are underway. Only in the Strategic Petroleum Reserve program, where past balances from other offsetting accounts are no longer available, does our budget proposal request additional funding to maintain critical operations.

In short, our FY 1997 budget reflects the Administration's continued commitment to ensuring the full benefits of fossil fuels – through R&D, completion of the Clean Coal Technology Program, a fully capable Strategic Petroleum Reserve, and continued stewardship of the taxpayers' interests in the Naval Petroleum and Oil Shale Reserves – while also reducing the Federal budget.



*As energy consumption grows, fossil fuels will remain the Nation's energy mainstays.*

## OUR COMMITMENT TO RESULTS

The U.S. Federal investment in Fossil Energy R&D was over \$400 million last year, it will be about \$380 million this year, and the proposal for FY 1997 is about \$348 million. Another \$200 million to \$250 million is spent annually on maintaining the Strategic Petroleum Reserve. For that kind of money, the taxpayer has a right to expect results. Our program will deliver them.

- In the 2000-2010 timeframe, advanced technologies emerging from our program will permit U.S. industry to reduce emissions of nitrogen oxides and air toxics from existing power plants by 70-90% and reduce the cost of meeting existing and future regulations by over \$7 billion per year.
- Advanced power systems, dominated initially by natural gas technologies and later including new generations of coal systems, will not only be cleaner and more efficient than current systems, they will produce lower-cost electricity. This combination of improved environmental performance and greater affordability will be critical if U.S. companies are to compete – and win – in the domestic market and a burgeoning global market. Opportunities for increased sales of U.S.-technology could amount to \$6-10 billion a year from 2001 to 2030. If we do not capture these market opportunities, foreign competitors and foreign technologies will.
- The combination of reduced environmental compliance costs and the lower costs of new electric power supplies can have a dramatic impact on a domestic economy that already spends \$200 billion a year for electricity. Lower cost innovations in the power industry will certainly evolve more slowly and, particularly in the case of environmental compliance equipment, may not evolve at all without Federal R&D. Yet by using technologies from our program, U.S. industry could reduce annual electricity costs by \$8-13 billion beginning in the 2001-2010 timeframe.
- By assisting the domestic industry develop more effective and lower cost technologies to find and recover U.S. oil and natural gas, we can reduce the decline in domestic oil production by 1 million barrels per day and increase U.S. natural gas production by 2 trillion cubic feet per year beginning in the 2010-2015 timeframe. This increased U.S. production will directly benefit our economy by generating more than \$11 billion a year in domestic oil and gas sales – dollars that will stay in this country rather than flowing to foreign suppliers.
- Technologies emerging from the Federal R&D program provide U.S. policy makers with a more affordable alternative to future “command-and-control” environmental regulations. Particularly in regard to emissions of greenhouse gases and air toxics, our programs could potentially save the U.S. economy billions of dollars in costly new regulations.

- While we work toward a more efficient, affordable energy future, the U.S. taxpayer expects Government to ensure the greatest possible domestic security today. Our 20-year investment in the Strategic Petroleum Reserve has created the world's largest emergency oil stockpile. In FY 1997-2000, our continued investments in the Reserve will ensure that it remains fully capable of responding to possible supply interruption through at least the year 2025.

While ambitious, our goals are achievable because they build on a solid technological foundation – a foundation that exists because the U.S. has invested in clean, secure fossil energy technologies. For example, because of prior support for Federal fossil fuel research:

- In the early 1980s, our best studies showed that the most we could hope to achieve in terms of **coal-to-electricity efficiencies** was 38% – a small increase over the power industry's average of about 33-34%. Today, technologies demonstrated in our program are already operating at efficiencies of 42-43%. Our goal now is to push for efficiencies of 50-60% while lowering electricity costs. An important added benefit is that such systems emit much less CO<sub>2</sub> for each watt of electricity generated.
- In the early 1980s, oil and gas producers were stymied by continual failures of **diamond cutting drill bits**. DOE R&D solved the durability problem, and today, longer-lasting polycrystalline diamond drill bits save as much as \$1 million per well. Our goal now is to build industry's confidence in a new array of 21st century drilling and production technologies, such as air drilling and carbon dioxide-sand fracturing. Reducing drilling costs makes it practical to produce more oil and gas from U.S. reserves.
- When the Clean Air Act Amendments were passed in 1990, industry faced the prospects of huge costs for **controlling nitrogen oxides** (NOx). Today, because of successful demonstrations in the Clean Coal Technology Program, NOx reduction technologies perform far better than previous technologies, yet are among the lowest cost options available. One fourth of the coal-fired capacity in the U.S. now employs these technologies.
- Because of our investment in clean coal technologies, we have inaugurated a new era of **clean electric power generation from coal**. The pioneering Wabash River Coal Gasification Plant in Indiana, dedicated on November 8, 1995, is heralding an entirely new way to generate electricity from coal with sharply reduced environmental emissions and increased efficiency. In FY 1997, the Tampa (FL) and Sierra Pacific (NV) projects will add to U.S. leadership in gasification-based power technology.
- 10 DOE cost-shared oil recovery projects now have made available at least 40 million barrels of **additional crude oil** that otherwise would have been left in the ground. Moreover, these projects have encouraged additional privately-sponsored field operations, producing millions of barrels of additional oil from U.S. fields and hundreds of millions of dollars in additional royalty revenue and other economic benefits.

- A DOE-cosponsored **horizontal test well** in Michigan is producing 100 barrels of crude oil per day — easily surpassing the 5-barrel per day output of the best conventional well in the field. It could rejuvenate an oil-producing region that was on the verge of being abandoned.
- A new array of "**high-tech**" **oil and gas exploration tools** that can probe for hydrocarbons faster, deeper and with unprecedented accuracy is now being made available to industry. Ranging from 4-dimensional seismic analysis (where time is incorporated into the equations) to rugged seismic sources that can be lowered deep into boreholes, to a novel device that can detect hydrocarbons through the metal casing of older wells, these new technologies offer the prospects of discovering oil and natural gas deposits that have been missed by conventional methods.
- A sophisticated methodology that allows State regulators to validate "**area of review**" **variance requests** for oil and gas disposal and injection wells has saved East Texas producers more than \$86 million in regulatory compliance costs.
- "Booked" natural gas reserves in Southwest Texas are being increased by nearly 4 trillion cubic feet due to DOE's support of a "**secondary gas recovery**" project that discovered large quantities of natural gas bypassed by standard field operations. Gross production revenues from these reserve additions alone could approach \$1.4 billion.
- The first "**advanced generation**" **fuel cells** are on schedule to begin testing in commercial settings this spring and summer. Intended to feed critical operational data back into the R&D program to lower costs, these field units (in Santa Clara and San Diego, CA) will help keep the U.S. perhaps 2 to 3 years ahead of foreign technology competitors.

In the **Strategic Petroleum Reserve Program**, we have made substantial investments over the last three years to refurbish and modernize the infrastructure to store and deliver emergency crude oil to the Nation. As this testimony will describe, we are well on our way to restoring the full readiness of this important national asset. Our FY 1997 budget builds on these investments, ensuring that we maintain the economic protection of a viable, responsive Strategic Petroleum Reserve.

Within budget limitations, we have also made investments in the future profitability of the **Naval Petroleum and Oil Shale Reserves**. The cogeneration facility, for example, is saving the Federal Government more than \$1 million a month in electricity costs and has made the Reserves a more attractive asset for divestiture.

## OUR COMMITMENT TO FISCAL STEWARDSHIP

The American taxpayer also has the right to expect the Federal Government to spend dollars prudently. The Congress has been blunt and direct in demanding federal agencies provide more benefits and products for lower budgets. We hear you.

Last year our budget for fossil energy research and development was \$417 million. This year's funding will be about \$377 million (on a comparable basis, i.e., without counting mining R&D transfers and prior year offsets). For FY 1997, we are requesting \$343 million, over 20% less than budgeted in FY 1995 (plus an additional \$5 million for materials R&D transferred from the Bureau of Mines).

Our budget is smaller, but we are not abandoning our responsibility to help solve critical national energy problems. Our strategy for addressing these issues with reduced resources consists of four components:

1. Sharply defining the *appropriate role for the Federal Government* and eliminating all non-essential or inappropriate research.
2. *Leveraging taxpayer funds* to the greatest extent possible, forming public/private partnerships where the national objective is common with private sector objectives.
3. Investing in *cutting edge technology* where the potential exists to "leap frog" traditional evolutionary advances that are more appropriate for private sector investment.
4. Implementing *better Federal management practices*.

### ***The Federal Role***

Within the last year, the Administration and Congress have moved significantly toward consensus on the role of Government in the fossil fuel portion of our energy sector. The Administration has proposed and Congress has approved a plan to divest the Elk Hills Naval Petroleum Reserve in FY 1998, recognizing that operating a commercial oil and gas field is not an inherent government function.

Within our R&D program, we have resisted the impulse to merely defend the status quo. The FY 1997 budget does not contain projects where there is no longer strong justification for Federal involvement. We have given highest priority to projects whose payoffs don't occur until the next decade and beyond, much farther into the future than the timeframe of current private sector R&D.

The Federal Government has a unique role in assuring that regulatory requirements, for example in the area of environmental compliance, do not choke our economy. As the originator of many of these regulatory requirements, the Federal Government can, and should, assist industry in developing technologies that can meet the standards cost-effectively. The track record in this area is good.

At many new power plants, the cost of complying with sulfur dioxide (SO<sub>2</sub>) regulations is now about half what it was a decade or so ago largely because of Government-industry R&D partnerships. Most new nitrogen oxide control (NOx) technologies now being installed on existing power plants are products of joint Federal/private efforts. Today because of DOE's R&D, we know

much more about the nature and amount of potentially toxic air pollutants that are released from power plants, so that any future regulations, if necessary, can be based on sound science. We have developed environmental management systems that dramatically reduce the cost of preventing ground water pollution from oil and gas wells, and we are now working with State regulators to implement these better approaches to regulation.

The Federal Government also has a unique role in preparing this country for future environmental challenges. Today, for example, there is no strong economic incentive for the private sector to conduct research on reducing greenhouse gas emissions. Yet, one day such reductions may become an environmental imperative.

The world is using more fossil fuels, especially coal. In fact, more than 92% of total global manmade carbon emissions are released from outside the United States. Finding an affordable, technological way to cut greenhouse gas emissions may not only preclude the need for costly “command-and-control” regulations, it can create exportable technologies that sharply reduce the *global* growth in greenhouse gas emissions. The higher-efficiency technologies in our FY 1997 R&D program offer these technological alternatives; they lower CO<sub>2</sub> emissions by more than 40% compared to existing options while, at the same time, *reducing* energy costs.

The Federal Government also has a unique role in assuring the security of the United States. Increasingly, economic security – and perhaps eventually, even national security – is inextricably tied to energy security. The role of our Strategic Petroleum Reserve as both a deterrent and a defense to future oil embargoes is obvious. The Reserve, however, is a short-term response. Over the longer-term, our security may be increasingly linked to how well we can produce secure sources of fuels domestically. Indeed, the Energy Information Administration’s current energy projections show an upturn in domestic oil production – but only if new technologies become available.

Likewise, advanced technology may one day allow us to use the *full range* of our domestic resources to produce critically needed liquid fuels. For example, while the payoffs of converting coal and natural gas to liquid fuels are too distant to encourage much private sector R&D, Federal R&D has made important advances that have likely shortened the timeframe for these options. It may be possible with advanced technology now at the laboratory and benchscale to produce liquid fuels from coal at the equivalent of \$25 per barrel of oil by 2010. The Energy Information Administration projects that the price of oil should pass \$25 per barrel in the year 2015. Therefore, if our long-range R&D is successful, we can provide policy makers with a new, domestically-secure option to ensure adequate energy to fuel our economy.

### ***Leveraging Government Funds***

The Clean Coal Technology Program and our Oil Recovery Field Demonstration Program are perhaps the best examples of government/private sector teaming and cost-sharing. In both, private sector funding accounts for about 60%. We have extended this cost-sharing principle to other Fossil Energy research activities, particularly for those R&D efforts that are beginning to show commercial promise.

For example, as our advanced fuel cell and gas turbine research continues to progress into more mature stages of engineering development, the Federal funding share has declined and the private sector contribution has increased markedly. In these programs, by the time the final stage of R&D is reached, private cost-sharing will be 60-70% of the development costs. The same increases in private sector cost-sharing can also be found in several other parts of our R&D program.

As the private sector sharply cuts back its R&D investments, we have found that Federal cost-sharing is being viewed by industrial developers as increasingly important in preserving technological progress. In turn, we use cost-sharing as a clear gauge on whether the R&D we are pursuing continues to attract private sector support.

### ***Investing in “Leap Frog” Technology***

Our world is rapidly changing, and the rate of change is accelerating as technology advances. Emerging innovations in data and information technology (like computers and advanced communications), advanced materials (ceramics and composites), miniaturization, catalysts, and biotechnology can have dramatic effects on the future of energy technology.

Beginning in FY 1997, we will be carrying out a small effort to ensure that we are taking full advantage of research progress in areas that may not have been viewed in the past as traditional fossil fuel disciplines. We will ensure that researchers outside of our program are familiar with energy research needs which might benefit from these emerging technologies.

For example, we envision a future in which the cost of expensive demonstration plants can be dramatically mitigated by demonstrating small scale components and simulating the effect of scale-up and integration with advanced computer programs. There is also the long-range potential of applying genetic engineering and biological processes to solving difficult environmental problems at much lower costs than traditional chemical approaches.

In other words, we are positioning our program for the post-2000 era in which creativity and imagination can lead to significant cost- and time-savings in developing new energy products.

### ***Managing Government Funds Better***

Both Congress and the Administration agree on the need to improve management efficiency throughout Government, permitting more funding to go to vital programs and less to administrative overhead.

Our FY 1997 budget reflects the first year of the substantial savings that were envisioned when the Department initiated its Strategic Alignment Initiative in 1994. Management costs in the FY 1997 research and development program will be nearly 22% less than in FY 1995. We will save at least \$125 million over the next five years by streamlining our headquarters organization and by

consolidating management and administrative functions at our three R&D field centers. By the end of FY 1996, instead of three separate field offices each with their own administrative staff, we will have a single, integrated field office sharing administrative resources at three locations.

We have already eliminated two smaller field research offices (at Metairie, LA, and Laramie, WY). By the end of FY 1996, we will have three fewer Deputy Assistant Secretary offices at headquarters than we had in 1995. By the end of FY 1997, our Federal research and development staff (at both headquarters and in the consolidated field offices) will be over 150

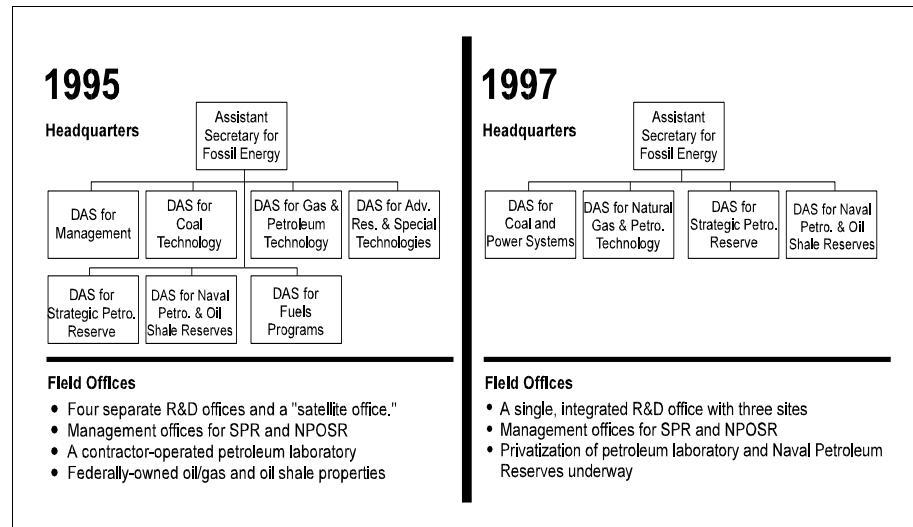
positions less than in FY 1995, while our contractor workforce will be reduced by more than 300 positions. The Strategic Petroleum Reserve staff (both headquarters and in the field) will be 16 staff positions smaller in FY 1997 than in FY 1995.

Our plans to privatize the National Institute for Petroleum and Energy Research in Bartlesville, OK, beginning this summer, are projected to save the Government \$25-35 million. The sale of the Elk Hills Naval Petroleum Reserve (if an acceptable sales price can be obtained) could net the U.S. Treasury well over \$1 billion over the next five years and allow further reductions in the size of the Fossil Energy workforce.

## THE FY 1997 FOSSIL ENERGY R&D PROGRAM

Our proposal for Fossil Energy R&D funding in FY 1997 is predicated on:

- Ensuring that all projects reflect a correct perspective on the appropriate role of the Federal Government in energy R&D;
- Providing American taxpayers with real measureable results in terms of energy, environmental and economic benefits;
- Minimizing the cost of necessary research through careful planning and effective management.



*Our 1997 headquarters organization will have three fewer Deputy Assistant Secretaries and a significantly restructured field organization.*



The result is the following budget proposal:

<b>FOSSIL ENERGY R&amp;D</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
Coal Technology R&D	\$130.18	\$108.88	<b>\$91.97</b>	-15%
Natural Gas R&D	109.47	112.19	<b>103.71</b>	-8%
Petroleum R&D	75.21	55.71	<b>52.54</b>	-6%
Advanced Crosscutting Research	14.28	12.38	<b>10.66</b>	-14%
Program Direction & Management	72.66	66.60	<b>57.16</b>	-14%
Plant & Capital Equipment	5.01	4.00	<b>3.30</b>	-18%
Environmental Restoration	15.30	14.92	<b>15.03</b>	+1%
Cooperative R&D	8.86	6.30	<b>4.00</b>	-36%
Fuels Programs (Regulatory)	3.00	2.69	<b>2.19</b>	-19%
Mining R&D (transfer from DOI)	0	40.00	<b>5.00</b>	NA (transfer)
DOE-Wide Working Capital Fund	4.27*	4.33*	<b>2.95</b>	-32%
Subtotal	\$438.24	\$428.00	<b>\$348.51</b>	-19%
Prior Year Offsets	-16.87	-6.50	<b>0</b>	
<b>Total - Fossil Energy R&amp;D</b>	<b>\$421.37</b>	<b>\$421.50</b>	<b>\$348.51</b>	-17%

\*Shown for comparability purposes

To improve our management and take advantage of program synergies, we have begun incorporating a “business line” approach. Rather than managing the Fossil Energy research program solely by fuel types (coal, oil, natural gas), we approach our strategic planning and implementation from the perspective of market sectors, e.g., electric power systems, natural gas and oil exploration and production, advanced clean fuels production, etc. This testimony is organized in this manner:

### **Advanced Electric Power Systems R&D - Keeping Innovation Alive as the U.S. Market Restructures**

Our FY 1997 research program on advanced generations of high-efficiency power systems is funded from both the coal and natural gas budgets. The major elements are:

<b>ADVANCED POWER SYSTEMS</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
<b>Coal</b> - Advanced Clean/Efficient Power Systems	\$87.66	\$80.28	<b>\$66.81</b>	-17%
<b>Natural Gas</b> - Advanced Turbines	\$36.98	\$36.77	<b>\$31.60</b>	-14%
<b>Natural Gas</b> - Fuel Cells	\$46.96	\$52.46	<b>\$46.62</b>	-11%
Total - Advanced Power Systems	\$172.60	\$169.51	<b>\$145.03</b>	-14%

This budget request has been shaped by two major challenges that confront the U.S.:

1. The risk that the United States will lose a substantial share of the global power technology market if it does not sustain the same type of government/industry R&D partnerships that our competitors are now creating;
2. The profound changes in the U.S. utility sector's approach to R&D which have sharply curtailed private funding and shifted the remaining dollars primarily to projects with almost immediate payoffs. A principle "victim" of private sector cutbacks has been long-term R&D for "public good" benefits such as lower cost environmental protection, even though there is strong public expectation that environmental quality must continue to improve even as our economy grows and energy consumption rises.

**The Global Economic Challenge** - Nowhere is global competition more intense than in the worldwide electric power market.

The world is increasingly turning to electricity to power economic growth. Outside the United States, the market for electric power systems could be as large as \$1 trillion in 2015. A country that captures only 20% of this market would sell more than 400,000 megawatts of power generating capacity and bring in revenues of nearly \$200 billion.

We can be such a country if we aggressively pursue technology development in joint government-industry partnerships.

Other governments certainly recognize the potential. The governments of Japan and Germany, for example, have increased cooperative efforts with their private companies to develop technologies for global sale. Japan, in spite of a flat economy, has nearly tripled its funding over the past five years for advanced coal combustion technology – the technology most in demand in the world export market. Today, on a dollar-for-dollar basis, the Japanese government's investment in cleaner, more efficient coal-burning technology matches that of the United States. Japan reportedly spends nearly three times more on fuel cell research.

**The Decline in U.S. Private Sector R&D** - While other countries increase their energy R&D investments, public and private expenditures for energy R&D in the United States continue to decline.

In the U.S., the utility sector is struggling with the uncertainties of approaching widescale deregulation. While some States that are leading the restructuring are adopting policies to promote some categories of R&D, during this critical transition period Federal R&D support becomes even more important in sustaining the Nation's technological progress. Confronted by uncertainty, power companies have sharpened their focus to more immediate concerns, seeking a competitive edge primarily by cutting costs. R&D funding, especially for the longer term, has been severely reduced. Utility heavyweights, including all of the Florida utilities, have withdrawn from the Electric Power Research Institute (EPRI) as a result of competitive pressures to cut costs.

In the January/February 1996 issue of *EPRI Journal*, EPRI's Vice President Kurt Yeager writes "...as competition intensifies, strategic planning horizons are shrinking. For many utilities, it's a question of how an investment will pay off not three or five years down the road but over the next six months or year ...." [Emphasis added].

The private sector's focus on near-term competitive needs means that the Federal government is playing an increasingly important role in maintaining the Nation's R&D progress toward energy systems for the post-2000 timeframe. In today's R&D climate, beyond the year 2000 is "long term," and that is where our R&D program is targeted.

**The FY 1997 Federal Program** - Our request for advanced power systems R&D is \$66.8 million in the Coal R&D budget and \$78.2 million in the Natural Gas R&D budget. In both programs, our focus is on developing the technical foundation for concepts in the 2000-2010 timeframe for commercial readiness – well beyond the R&D horizon of today's private sector.

**The coal-related power systems funding** will support longer-range technologies with a goal of reducing emission levels to 1/10th of today's permissible limits, boosting efficiencies to levels beyond 50% (today's plants operate at 33-34% efficiency levels), and reducing CO<sub>2</sub> emissions by 40% or more — while at the same time, reducing the costs of generating electricity by 10-20%. Our request includes \$57.0 million in funding for advanced low emission boiler concepts, new generations of pressurized fluidized bed combustion and integrated gasification combined cycle systems, and the innovative concept of an indirectly fired, combined cycle system. Another \$9.8 million is requested for research on advanced environmental control systems that can reduce air toxics, fine particulates and other air emissions, as well as longer-term research on CO<sub>2</sub> control and disposal.

**The natural gas power systems funding** involves research on advanced gas turbines and fuel cells. In both, our target is to develop the first prototypes of market-ready advanced systems in time (by the year 2000) to meet the "window" for technology exports to underpowered regions of the world. Our advanced turbine program (\$31.6 million) remains on pace to develop by the year

2000 an ultra-high efficiency (exceeding 60%) turbine that can give the U.S. a virtually insurmountable technical lead in the global market. Our fuel cell program in FY 1997 (\$46.6 million) will continue the R&D push necessary to position U.S. industry to introduce advanced molten carbonate and solid oxide fuel cells into the multi-kilowatt onsite and low megawatt utility markets in the year 2000. Ultimately, in the post-2000 timeframe, our research program will result in both fuel cells and advanced turbines being adapted for coal as well as natural gas.

### **Advanced Clean Fuels Research - Providing a Long-Term Alternative to Imported Oil**

Our request for \$15.95 million for advanced coal-based clean fuels research keeps the option available to one day refine coal to a variety of liquid fuels and chemicals that might be needed as substitutes for petroleum-based products. This reduced funding will continue to keep our program progressing toward the goal of producing clean liquids from coal at a cost of \$25 per barrel. Progress to date has developed liquefaction technology that has reduced the cost of producing clean coal liquids from \$50 per barrel in 1980 to a projected commercial cost of about \$32 per barrel today. In FY 1997, the liquefaction program will focus on advanced catalysts and innovative coal-waste and other co-processing concepts that are critical next steps in meeting our cost goals.

The coal preparation budget will continue to emphasize advanced methods for removing the impurities that can cause emissions of air toxics and other air pollutants. Advanced coal cleaning has the potential to provide the lowest cost means of reducing mercury emissions from power plants.

The funding levels for this program are:

<b>ADV. CLEAN FUELS RESEARCH</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
Coal Preparation	\$7.04	\$4.66	<b>\$5.10</b>	+9%
Direct Liquefaction	8.62	5.58	<b>5.86</b>	+5%
Indirect Liquefaction	12.20	5.84	<b>4.25</b>	-27%
Adv. Research & Environmental Tech.	3.90	3.55	<b>0.75</b>	-79%
Systems for Coproducts	0.90	0	<b>0</b>	
<b>Total, Advanced Clean Fuels Research</b>	<b>\$31.85</b>	<b>\$19.63</b>	<b>\$15.95</b>	-19%

### **Advanced Research and Technology Development - Undergirding Tomorrow's Advances**

This research provides the fundamental science and engineering basis for future fossil fuel concepts. In the FY 1997 budget we have organized this activity into two categories: (1) Coal-specific research and analysis, and (2) Fossil Energy-wide support. This reflects that some activities previously shown under the coal R&D budget actually benefit the natural gas and petroleum R&D programs as well.

The funding levels for this program are:

<b>ADV. RES. &amp; TECH. DEVELOPMENT</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
<b>Coal-Specific Research &amp; Analysis</b>				
- Coal Utilization Science	\$3.04	\$3.15	<b>\$3.15</b>	--
- Coal Technology Export	0.82	0.82	<b>1.05</b>	+28%
- Bioprocessing of Coal	1.93	1.00	<b>1.00</b>	-
- University Coal Research	4.90	4.00	<b>4.00</b>	-
<b>Fossil Energy-Wide Support</b>				
- Materials and Components	8.57	6.93	<b>5.27</b>	-24%
- Environmental Activities	1.81	2.51	<b>2.24</b>	-11%
- Technical and Economic Analysis	0.69	0.96	<b>0.86</b>	-10%
- International Program Support	1.30	1.01	<b>1.16</b>	+15%
- Instrumentation and Diagnostics	0.96	0	<b>0</b>	-
- HBCU, Education and Training	0.94	0.97	<b>1.14</b>	+17%
<b>Total, Adv. Research &amp; Tech. Development</b>	<b>\$24.96</b>	<b>\$21.35</b>	<b>\$19.87</b>	<b>-7%</b>

### **Natural Gas and Petroleum Exploration & Production - Tapping the Full Potential of Secure Domestic Supplies**

Today the United States is not able to tap the full potential of its domestic petroleum and natural gas resources. Continuing low world oil prices have imposed a severe disincentive on the private sector's development of advanced exploration and production technologies.

Even though we are endowed with huge quantities of unproduced petroleum, the profit margin to produce oil from much of our domestic resource base is extremely thin or, in some cases, virtually non-existent in today's economic environment. Thus, increasing amounts of oil are imported into the U.S. while domestic oil resources remain unproduced.

Likewise, trillions of cubic feet of natural gas remain locked in deposits that are too difficult or expensive to extract with today's technology. Lower cost, more effective technology could bring this gas onto the market, helping to further diversify our domestic energy mix. But low gas prices are discouraging private investment in the needed R&D.

The FY 1997 Fossil Energy budget is attempting to address this situation by developing technologies that lower the cost of finding and producing crude oil and natural gas in the United States.

Our budget request includes:

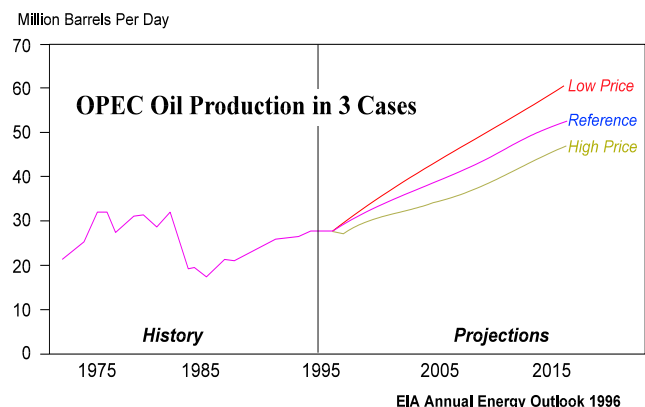
<b>NATURAL GAS and PETROLEUM EXPLORATION &amp; PRODUCTION</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
<b>Natural Gas</b> - Exploration & Production	\$18.37	\$14.16	<b>\$15.00</b>	+6%
<b>Petroleum</b> - Recovery Field Demonstrations - Exploration & Production Supporting Research	28.29 35.43	11.08 33.48	<b>6.10 34.02</b>	-45% +2%
<b>Total, Exploration &amp; Production</b>	<b>\$82.09</b>	<b>\$58.72</b>	<b>\$55.12</b>	-6%

**The Threat of Increasing Oil Imports** - Low cost foreign oil continues to flow into the United States at all-time record rates. Immediately prior to the 1973 oil crisis, the U.S. was importing less than 27% of its crude oil. When the 1979 oil price shock hit, U.S. imports were less than 43% of the Nation's oil consumption. Today, oil imports account for 46% of our oil needs, and by 2010, could account for more than 60% of our supply.

In fact, just the increase in U.S. crude oil imports in the last 10 years (1985 to the present) – from 5.1 million barrels per day to nearly 9 million barrels per day – is itself greater than the total oil consumption of any other country in the world, except Japan and Russia.

Although non-OPEC nations did increase production by almost 15 percent from 1980 to 1990, they increased proven reserves by only 10 percent. On the other hand, while OPEC increased production by 20 percent in the 1980s, it increased its proven reserves by 75 percent. As a result, OPEC's reserves-to-production ratio doubled to 90 years while the remaining years of production for non-OPEC reserves have actually fallen, from 18 years to 17 years.

This situation raises the likelihood that the potentially unstable Persian Gulf could return to dominance in meeting the world's growing appetite for oil. With two-thirds of the world's oil reserves, the Persian Gulf is expected to supply more than 75% of the increase in global demand for oil over the next 15 years. By 2010, the Persian Gulf's share of the world export market could surpass its highest level to date - 67% - attained in 1974. If low oil prices persist, fully 75% of the world's petroleum trade could be supplied by the Persian Gulf by the end of the next decade.



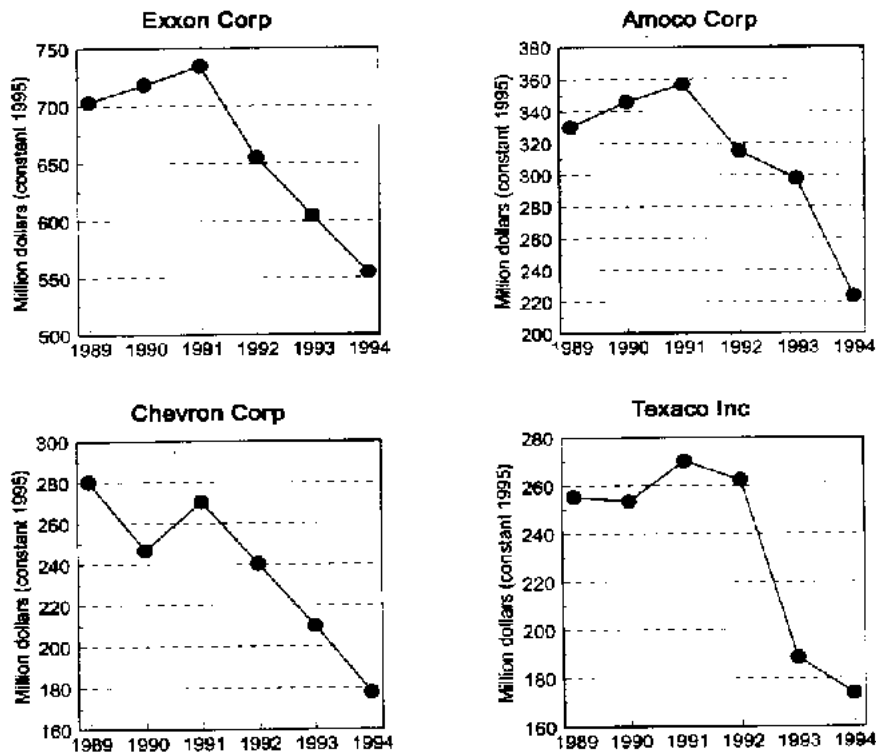
*OPEC, with its vast store of readily accessible oil reserves, is likely to be the major supplier of the world's increasing demand for oil. EIA forecasts that by 2010, OPEC could be producing about twice the level it produced in 1990.*

**Decline in U.S. Oil Production Hastened by High Production Costs and Lack of Private Investment** - Even as foreign oil imports rise, the U.S. continues to abandon domestic wells at an alarming rate. In the last 10 years, more than 173,000 U.S. oil wells have been abandoned. Oil production from stripper wells is now at its lowest level in nearly 50 years.

With low oil prices expected to persist, the marginal U.S. producer (now almost solely a small, independent company working on the economic edge) increasingly faces the likelihood of plugging and walking away from uneconomic wells, despite the fact that billions of barrels of producible oil still remain in the ground. By 2020, as much as 80% of the U.S.'s remaining oil resource could be abandoned unless better technologies become available.

Historically, independent producers (who drill 85% of U.S. wells) could look to the major oil companies for new technologies that could improve the prospects for keeping U.S. oil fields active. But that is no longer the case. The following shows R&D spending by four major oil producers. Although these charts include several categories of company-sponsored R&D – and it is difficult to separate funding for upstream and downstream oil R&D and other corporate R&D activities – the trends are unmistakable:

### Research Spending by Major Oil Companies



Source: Schonfeld and Associates 1995, 1994

In the natural gas industry, the 337-member Gas Research Institute (GRI) recently announced a 20% reduction in its 1996 research program, stating that its “funding base has continued to erode” because of increasing competitive pressures brought about by deregulation. The institute proposes to eliminate 1996 funding for 17 previously-approved projects. It has already announced staff cuts and predicts that more personnel and research cuts will occur in 1997.

Private sector oil and gas technology developers – like the industry itself – are in a state of transition brought on by the collapse of oil prices in the 1980s and the expectation of constrained oil and gas prices in the foreseeable future. While opinions differed on the impact of reductions in private sector R&D spending in a recent National Petroleum Council survey, the Council’s consensus was that “besides the direct pressures on in-house developers created by oil prices and resulting requirements for cost reduction, there are other indirect pressures that have resulted in a greater proportion of *short-term and technical service-type activities*.” [Emphasis added]

**The Potential for Natural Gas** - Research cutbacks are coming at a time when natural gas use is projected to grow significantly in the U.S. energy market. Traditionally its most important use has been in the residential sector (where it supplies nearly half of all energy consumption), but in the future, natural gas is projected to increase its contribution in other energy sectors, most notably in the electric power generation and transportation markets. In fact, the Energy Information Administration forecasts that domestic natural gas consumption will increase by one-third over the next 20 years. About half of this increase will be to fuel electric power plants.

For the full potential of domestic natural gas to be realized, consumers must be confident that long-term supplies are adequate and affordable. Particularly in the electric utility market, where decisions are based on 30 year-plus plant life expectancies, the long-term future of natural gas reserves must be assured. Technology will largely determine whether or not these assurances can be given.

For example, in February 1995, the U.S. Geological Survey doubled its estimates of the nation’s onshore inferred natural gas reserves (from 114 trillion cubic feet in 1995 to 232 trillion cubic feet in 1996). The reason for this increase was largely attributed to the rates of technological progress applied to exploration, drilling, and production. In the future, a significantly greater share of U.S. natural gas production will have to come from frontier supply sources, e.g., dense formations in the West and deeper gas formations both on- and offshore. In these formations, gas production will be much more sensitive to the rate of technology improvement than in the past.

In other words, for U.S. consumers (especially utilities) to have sufficient confidence to make the 30-year or more investments in new gas applications (like turbine and fuel cell-based power plants) that can expand the use of natural gas in the United States, R&D investments must be made today to assure adequate gas supplies in the 2010-2050 timeframe. Privately-sponsored R&D is not focusing on this long-range time horizon.



**The FY 1997 Federal Program** - Our request for \$55.12 million in advanced exploration and production technology (\$15.00 million in the natural gas program; \$40.12 million in the petroleum program) will continue our highly-leveraged program with U.S. industry to bring down the costs of production through implementation of innovations in exploration, drilling, and production technologies. Through a combination of improved technologies and lower regulatory compliance costs (see p. 18), our goals are to:

- assist domestic producers increase domestic oil production by nearly 1 million barrels per day by 2015 (equivalent to nearly 1 out of 6 barrels produced from U.S. fields in 2015);
- assist natural gas producers increase their production by nearly 2 trillion cubic feet per year (7% of expected demand) by 2010;
- enhance the value of Federal lands which account for 20% of the Nation's oil production and 35% of the Nation's natural gas production.

In the **natural gas exploration and production program**, our research will continue to concentrate on innovative technologies that can dramatically increase the speed and accuracy at which wells can be drilled, reduce damage to underground formations (thereby extending the life of production), and reduce the investment costs of drilling equipment. Given that U.S. industry is projected to spend nearly \$14 billion by 2010 to drill new gas wells, even a small improvement in drilling costs can have enormous benefits. Slimhole drilling tools being developed in our partnership program with industry, for example, are projected to reduce drilling costs by 40%. Underbalanced drilling technology and advanced downhole telemetry systems also hold the potential for significantly lowering the costs of drilling new wells.

We will continue to study advanced techniques for producing natural gas from the low-permeability formations of the West (such as the Greater Green River and other priority basins in Wyoming, Utah and Colorado). These hard-to-produce reservoirs are critical to providing long-term confidence in natural gas supplies. Advanced research in fracture detection and mapping that is well beyond the timeframes of today's industry can boost production from these domestic resources for many decades into the 21st century. We have also included funding for our part of joint efforts with the U.S. Geological Survey to develop a better "engineering profile" of the national gas resource base, something that is beyond the scope of individual companies.

In the **oil exploration and production programs**, our focus will be on two major activities: 1) the joint government-industry, recovery field demonstration program; and 2) the longer-range, supporting research program.

In the recovery field demonstration program, in FY 1997 we intend to complete Federal funding for all of the "reservoir class" field projects and carry out a limited effort to assist companies develop better reservoir management techniques in economically-marginal fields and to help small operators find ways to keep marginal wells in production.

Our supporting research program looks well into the 21st century when tomorrow's domestic producers will need much better technologies to explore for remaining oil supplies, to characterize more difficult and complex U.S. reservoirs, and to drill for and extract oil supplies even more cost effectively. We will continue to study advanced concepts – such as cat-scanning and magnetic resonance imaging – that can image hydrocarbons and other fluids in reservoir rocks and lead to better production efficiencies. We will continue to work on innovations in longer-range production technology, such as advanced thermal flooding for heavy oil, microbial-biotechnology recovery, and new thermal and carbon dioxide flooding techniques for light oil fields.

Three-dimensional (3D) seismic depth imaging, in particular, can reveal untapped hydrocarbons. Bringing this advanced technique into greater use, however, demands extremely sophisticated technology and gigantic computing power. The know-how to make this possible exists in the United States; nuclear test computational expertise developed from our Cold War investments in our National Laboratories is directly applicable. For example, a joint project between Sandia National Laboratory and several computer companies has led to new computer code that cut computational time from days to hours. This unprecedented processing speed now makes it possible to search for oil and gas in regions that historically have been beyond the reach of conventional technology – for example, the potentially huge reservoirs that may lie beneath salt sheets in the Gulf of Mexico. We propose to continue the very successful national laboratory-industry partnership program, transferring our investments in national defense technologies to the production of domestic energy. In our FY 1997 partnership program, we propose to integrate high-performance computing technology into the ongoing national laboratory-industry activities.

### **Natural Gas and Petroleum Environmental Research - Lowering Compliance Costs Through More Reasonable Regulations**

Improved technology is only one way to lower the costs of producing domestic oil and natural gas supplies. Equally beneficial may be reductions in environmental compliance costs. In 1984, the oil and natural gas industry spent \$3.6 billion per year to comply with local, State and Federal environmental regulations. By 1993, compliance costs had risen to \$10.6 billion per year. Over the next 5 years, new regulatory proposals could add another \$14 billion per year. These added costs translate directly into lower domestic oil and gas production, especially from marginal properties.

The Nation, however, does not have to bear these huge economic burdens to have a clean, safe environment. Applying sound science, risk-based analysis, and credible methodologies can dramatically reduce compliance costs to industry without impairing public health and safety or endangering the environment. New, lower cost environmental compliance technologies can also reduce economic burdens and allow more dollars to be invested in actual oil and gas production.

The Federal Government has a unique and important role in developing mechanisms to streamline and improve existing regulations and laws as well as to ensure that future requirements are based on sound science. Our FY 1997 program places one of its highest priorities on showing

State, local and Federal regulatory authorities how to protect the environment and at the same time, reduce compliance costs on our domestic industry. This increased emphasis is the reason for the higher proposed budget levels for this program:

<b>NATURAL GAS and PETROLEUM ENVIRONMENTAL RESEARCH</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
<b>Natural Gas</b> - Environmental Research/Regulatory Impact	\$2.93	\$2.95	<b>\$4.65</b>	+58%
<b>Oil Technology</b> - Exploration & Production Environmental Research	4.69	5.46	<b>6.46</b>	+18%
Total, Gas & Oil Environmental Research	\$7.62	\$8.41	<b>\$11.11</b>	+32%

In the **natural gas environmental research/regulatory impact** area, our efforts range from developing remote methods to detect natural gas leaks from pipelines to the pilot testing of more cost-effective techniques for treating and disposing of naturally-occurring radioactive material (NORM). The methane leak detection technology takes advantage of a government-developed innovation by Sandia National Laboratory for video imaging hydrocarbons. Its development will not only lower economic losses for the industry but also significantly cut atmospheric emissions of methane, a powerful greenhouse gas. Our research into the treatment and disposal of NORM will provide credible risk-based scientific information to State regulators (who are now developing requirements for NORM waste management), potentially lower the disposal cost of NORM waste from \$1000 per barrel (of waste) to \$300 per barrel, and demonstrate NORM disposal techniques that do not require transporting the waste off the property.

In the **oil technology environmental research program**, our goal is to lower the costs of complying with regulations for disposing of water and sand produced from oil/gas well operations, and to develop ways to better assess and mitigate the risks to groundwater from oil and gas operations. We also propose to expand our assistance to States in applying a nationally-developed methodology for assessing the risks of injection wells, ensuring that States have adequate tools to streamline and improve regulations. A national network of 25 States now exists to implement the DOE-developed, risk-based management system.

A key element in both the natural gas and oil environmental research area is an active outreach program with States, local agencies and producers. Although not a high-cost budget item, DOE's efforts to facilitate dialogue among producers and regulators has been highly productive in reducing institutional barriers and preserving U.S. oil and gas production while enhancing environmental protection.

We estimate that the oil and gas environmental research program, if funding can be sustained at the FY 1997 levels, can increase U.S. oil production, for example, by more than 200,000 barrels per day and natural gas production by 0.5 trillion cubic feet per year in 2015 through a combination of better risk assessment, regulatory streamlining, and lower cost compliance technology.

### **Downstream Research - Ensuring that Domestic Natural Gas and Oil Reaches Customers Efficiently and Affordably**

While improved exploration and production technologies and cost-effective environmental compliance are crucial if the U.S. is to tap the full potential of its oil and natural gas resources, “downstream R&D” also offers opportunities for improvements that can increase the supply of domestically-produced energy reaching U.S. consumers. The major elements of this budget are:

<b>DOWNSTREAM RESEARCH</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
<b>Natural Gas</b>				
- Gas Storage R&D	\$1.05	\$1.07	<b>\$1.00</b>	-7%
- Utilization (Low-Quality Gas Upgrading and Gas-to-Liquids R&D)	3.19	4.77	<b>4.84</b>	+1%
<b>Oil Technology</b>				
- Processing Research & Downstream Operations	\$6.80	\$5.70	<b>\$5.96</b>	+5%
<b>Total, Downstream Research</b>	<b>\$11.04</b>	<b>\$11.54</b>	<b>\$11.80</b>	<b>+2%</b>

**Gas storage** is the critical link between producers and consumers. It plays an increasingly significant role in the growth of the North American natural gas market, especially in the post-FERC Order 636 deregulation environment. Since 1990 use of gas storage to meet peak winter heating demands has increased 20%. Particularly for “nonfirm customers” – those who risk being cut off in times of peak gas demand – the speed and efficiency with which gas companies can extract natural gas from storage is extremely important. The responsiveness of storage fields to peak demands is both weather- and price-driven; however, improved technology plays a critical role in assuring that these fields can deliver when called upon. DOE’s efforts in this area primarily support “cooperative research and development agreements” with industry to improve the design, development and flexibility in gas storage field operations.

The **natural gas utilization program** provides two approaches for ensuring that the Nation’s gas supply is used to its full potential. More than 1/3rd of the natural gas in the United States is below the standards demanded for pipeline transport. The goal of DOE’s low-quality gas upgrading program is to develop affordable technology that industry can use to can add as much as 750 billion cubic feet per year to the Nation’s gas reserves by 2010. The gas-to-liquids program is targeted at producible gas formations that are too remote from pipelines to make production economical (such as Alaskan North Slope and deep offshore Gulf of Mexico gas). Research into lower-cost

technologies for converting this gas into clean liquid transportation fuels could potentially displace as much as 500,000 barrels per day of imported oil by 2010. Early testing shows the potential for producing gas-derived fuels competitive costs and with an environmental quality superior to current least-polluting, oil-derived liquid transportation fuels.

**Oil processing and downstream operations research** is targeted directly at slowing the trend for crude oil to be processed overseas before being shipped to the U.S. Research that can assist refineries in complying with environmental requirements as well as reducing the formation of pollutants can have dramatic payoffs. America's economic growth will demand about 1 million barrels more refined product by the year 2000. At the same time, the domestic refining industry is being required to spend billions of dollars to comply with new environmental regulations. By developing better environmental data and technologies, we can assist industry in achieving superior environmental compliance while saving consumers millions of dollars.

In addition, as U.S. crude oils become heavier and demand increases for lighter products (reformulated gasoline, oxygenated fuels, etc.), research that can increase the processing efficiencies of refineries can provide major, national dividends in terms of greater amounts of high-value, more affordable petroleum products.

### **Fossil Energy Management and Other Funding Requirements**

In addition to the technology programs described above, the Fossil Energy R&D budget also contains funding for administrative and other expenses. As the following chart shows, these funding requirements have been significantly reduced in line with management streamlining, downsizing, and privatization within the Fossil Energy organization:

<b>MANAGEMENT AND OTHER FUNDING REQUIREMENTS</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
Program Direction & Mgm't Support	\$72.66	\$66.60	<b>\$57.16</b>	-14%
Plant & Capital Equipment	5.01	4.00	<b>3.30</b>	-18%
Environmental Restoration	15.30	14.92	<b>15.03</b>	+1%
Cooperative Research and Develop.	8.86	6.30	<b>4.00</b>	-36%
Fuels Programs (Regulatory)	3.00	2.69	<b>2.19</b>	-19%
Mining Research and Development	0	40.00	<b>5.00</b>	NA (transfer)
DOE-Wide Working Capital Fund	[4.27]	[4.33]	<b>2.95</b>	-17%

Note: Working capital fund figures for FY 1995 and FY 1996 are estimated for comparability purposes only.

**Program Direction and Management Support** provides Federal salaries and other expenses. The significant reduction from FY 1995 to FY 1997 reflects the consolidation of the Fossil Energy R&D field structure and personnel downsizing throughout our organization:

- At headquarters, salaries and travel expenses will be reduced by nearly 17% from FY 1995 levels, while contract support increases slightly as we must now budget for a prorata share of the maintenance and operation of the DOE-wide computer network.
- In our R&D field offices, salaries, benefits and travel expenses will decline by more than 18% from FY 1995 to FY 1997 while technical and management contract support will decrease by more than 57% due to the consolidation of administrative functions at our field centers. (This significant reduction is masked somewhat by the inclusion of \$6 million in contract services for FY 1997 to pay transition costs associated with the privatization of the National Institute for Petroleum and Energy Research).

**Plant and Capital Equipment** funding provides for the continued upgrading of the Office of Fossil Energy's local area computer network, video conferencing equipment (which is saving substantial travel costs), and other hardware needs. Also included is \$2.3 million for general plant projects at our R&D field centers.

The **Environmental Restoration** budget funds the mandated cleanup of contamination at Fossil Energy sites and former Fossil Energy research and development projects, and ensures that our field facilities are in compliance with environmental, safety and health standards.

The **Cooperative Research and Development** budget provides Federal matching funds to the University of North Dakota Energy and Environmental Research Center and the Western Research Institute, permitting these former DOE facilities to attract private sector cost-sharing.

The **Fuels Program** budget provides the administrative expenses for carrying out legally required reviews of applications for natural gas imports and exports, exports of electricity, and the construction and operation of electric transmission lines across the U.S. border.

The **Mining R&D** budget proposal reflects Congress' action to transfer to the Department of Energy health and safety, materials, and mineral reclamation research activities of the Bureau of Mines. In FY 1996, these activities amounted to \$40 million which was transferred to the Fossil Energy budget; in FY 1997, we propose to retain only the materials R&D effort, funded at \$5 million, and transfer the health and safety program to the Department of Health and Human Services.

The **Working Capital Fund** is a new item being implemented DOE-wide in FY 1997. The fund will allocate costs to the program offices for rent, utilities, telephone and copier services, and other overhead charges previously funded in the Departmental Administration account. For comparison, pro rata estimates are shown for previous years.

## THE CLEAN COAL TECHNOLOGY BUDGET REQUEST

The Department believes it can reduce the amount of funding currently appropriated by Congress for the Clean Coal Technology Program.

The General Accounting Office recently cited the Clean Coal Technology program as a model for successful public-private cooperation. One of the reasons why the program has become a government-industry “success story” was the willingness of Congress to appropriate in advance the full funding required for the Government’s share of the jointly-financed, first-of-a-kind projects. This advanced appropriation of \$2.55 billion has given U.S. companies sufficient confidence to sign cooperative agreements committing nearly \$5 billion of their own funds to more than 40 projects.

Today, the most successful of these projects have established the technical foundation for a new era of high efficiency, environmentally clean energy production from coal. More than \$9 billion in domestic and international projects are benefitting from the technologies demonstrated in the Clean Coal Technology Program. U.S. companies now can offer sulfur reducing technologies which are half the cost of previous technologies. NOx reduction technologies demonstrated in the Clean Coal Technology Program already have been retrofitted on about one-fourth of the Nation’s coal-fired capacity.

Some of the remaining projects in the program, however, are likely not to complete their planned programs. In some cases, market conditions have changed; in other cases, the private sector partners have reevaluated their technology investment strategies. As a result, by the end of 1996, we expect that some projects will not go forward and others will be restructured resulting in significant cost savings.

Our FY 1997 budget proposal balances our need to maintain the Federal cost-sharing commitment to ongoing, viable projects, while at the same time, returning to the Treasury funding that is no longer needed and that can be used for deficit reduction.

We are proposing to rescind \$325 million from funding previously appropriated for the Clean Coal Technology Program. The original funding level approved by Congress was \$2.75 billion. In FY 1996, Congress approved a rescission of \$200 million, reducing the total Federal funding to \$2.55 billion. The FY 1997 proposed rescission would further reduce the Federal share to \$2.225 billion. In addition, the Department is proposing to defer authority to spend nearly \$313 million of available funds until FY 1998. Given that virtually all final project funding decisions will be made by the end of 1996, we should be in a position to recommend to Congress whether all or part of the \$313 million in deferred spending authority will be needed in FY 1998 to meet prior Federal commitments.

The Clean Coal Technology funding profile is:

<b>CLEAN COAL TECHNOLOGY</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996	<b>FY 1997</b>	FY 1998
Previously Appropriated Funding	\$36.28	\$150.00	<b>\$137.88</b>	
Proposed Rescission			<b>-325.00</b>	
Delay in Obligational Authority			<b>-312.88</b>	+\$312.88
New Funding Profile			<b>-\$500.00</b>	+\$312.88

### THE STRATEGIC PETROLEUM RESERVE BUDGET

The FY 1997 budget request for the Strategic Petroleum Reserve (SPR) is necessary to continue the substantial progress already made in bringing the Nation's emergency oil stockpile back to full readiness. The apparent significant increase in budget authority, however, as the following chart shows, is misleading.

Because prior year balances in the SPR oil account (from the sale of SPR oil during the Persian Gulf war) have now been exhausted, the source of SPR funding has changed. For the first time in several years, it is necessary to request a full level of new budget authority to maintain operations of the SPR. However, a comparison of funding levels for the facilities and management indicates that our FY 1997 request is actually a reduction from previous years.

<b>STRATEGIC PETROLEUM RESERVE</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
Strategic Petroleum Reserve Account				
- Facilities Development	\$226.93	\$270.17	<b>\$204.71</b>	-24%
- Management	16.73	16.83	<b>16.59</b>	-1%
<b>Total, Strategic Petroleum Reserve</b>	\$243.66	\$287.00	<b>\$221.30</b>	-23%

<b>Offsetting SPR Petroleum Accounts</b>				
- Transfer to Facilities Account	-90.76	-187.00	<b>0</b>	
- Transfer to R&D Account	-17.00	--	<b>0</b>	
- Weeks Island Sale Proceeds	--	-100.00	<b>0</b>	
<b>Total - New Budget Authority</b>	\$135.90	0	<b>\$221.30</b>	

The Strategic Petroleum Reserve has served as the Nation's first and principal defense against oil price shocks and supply interruptions for nearly 20 years since oil fill began in 1976. During that time, more than \$20 billion has been invested in purchasing more than 590 million barrels of crude oil (equivalent to 74 days of imports) and in the facilities to store and deliver the crude oil quickly into the U.S. market if necessary to counter an energy emergency. Today, the Reserve is well on its way toward returning to its full capabilities following a series of naturally-occurring geological problems:

- By the end of this year, all oil will have been removed from the Weeks Island site in Louisiana where a natural fracture has created concerns about the site's structural integrity;
- The problem of natural geologic heating that has raised the temperature of some of the stored oil above the safety threshold for drawdown has been corrected through the installation of surface heat exchangers;



- Oil that has an elevated level of methane caused by years of prolonged storage is being degassed at a rate of 100,000 to 200,000 barrels per day. The inventory of one site (West Hackberry) has been completely degassed, and our goal is to complete the entire degasification operations in 1998. At that point, drawdown capability will be extended to 3.9 million barrels per day compared to the current 3.4 million barrels per day.

In FY 1997, requested funding will be needed to complete the degasification and Weeks Island decommissioning efforts and to continue life extension and upgrading of the Reserve's infrastructure. By FY2000, the refurbishment program will be complete, and the Reserve will be capable of meeting emergency needs through at least the year 2025. The life-extension program will also have accomplished a major, long-term cost-savings goal: all new and replacement equipment will have been standardized, thereby streamlining warehousing, maintenance and operations.

With fiscal constraints requiring suspension of further oil fill, up to 80 million barrels of unused cavern capacity remains in the Reserve. DOE has approached several International Energy Agency member nations or nations seeking IEA membership to promote the use of this idle cavern space to meet their emergency preparedness obligations. Crude oil storage in the Reserve's salt caverns at a cost of less than \$2 per barrel annually may be an economically attractive option for countries facing construction costs of \$15 to \$50 per barrel for surface tanks or hard rock caverns plus additional costs to operate the reserves. In addition to generating revenues for the United States, such an arrangement could prove advantageous both to other stockpiling nations and to the U.S. by providing economical storage to other countries, promoting global oil stockpiling, and preserving storage caverns for future use. In pursuing this option, the Department will protect the integrity of the Reserve's facilities for future use and the ability of the United States to sell its stockpiled oil in an energy emergency.

Also, the Department has begun soliciting bids from private companies to lease or buy certain parts of the Reserve's oil delivery infrastructure. In some cases, for example the Weeks Island site pipeline, the Department will no longer require the facilities. In other cases, facilities are underutilized. DOE is pursuing an initiative to turn these facilities into a source of Federal revenue.

## **THE NAVAL PETROLEUM AND OIL SHALE RESERVES BUDGET**

The Department is requesting a minimum baseline budget for adequately maintaining the Naval Petroleum and Oil Shale Reserves while initiatives are underway to prepare the Elk Hills Reserve for divestiture and ascertain the future of the remaining Reserves.

In February 1996, Congress passed and the President signed the National Defense Authorization Act for FY 1996 (P.L. 104-106) which began the process of ending nearly a decade-long uncertainty about the fate of the government-owned portion of the Naval Petroleum Reserves.

Established early this century to provide a source of crude oil for the U.S. Navy, the Naval Petroleum Reserves no longer serve a national defense purpose. Since 1976, they have operated

essentially as a commercial business, generating more than \$13 billion in net proceeds to the U.S. Treasury. However, three Administrations, including the Clinton Administration, have questioned the role of Government as the owner of commercial oil and gas fields and sought authority to lease or sell these fields. Moreover, continued fiscal constraints have made it difficult to invest funding for facility upgrading and field maintenance necessary to maximize production and profits.

With the Congressional guidance provided by the National Defense Authorization Act, the Department is moving to place the Government's share of the Elk Hills field – the largest of the Naval Petroleum Reserves – on the market. Congress incorporated a legislative safeguard requiring the Department to determine that the market value of the field exceeds the value to the taxpayer of continued Federal ownership. If it does not, the Government will not proceed with the sale.

The law requires divestiture by February 10, 1998. As a result, the Department assumes that it will retain ownership of and management and responsibility for Elk Hills through FY 1997. Also, the legislation requires the Department to produce the Reserves at the maximum daily rates which will permit economic development. Finally, the legislation authorizes the Department to study potential options for the other properties in the Naval Petroleum and Oil Shale Reserves but does not authorize their sale.

The FY 1997 budget, therefore, provides a minimum level of funding to maintain proper stewardship of the fields while the divestiture and study initiatives are underway. The funding level will reduce the drilling and well remediation program to minimum levels while other development activities will be eliminated.

The funding profile is

<b>NAVAL PETROLEUM &amp; OIL SHALE RESERVES</b> (Budget Authority - \$ in millions)	FY 1995	FY 1996 Conference	<b>FY 1997 Request</b>	Change from FY96
Reserves Nos. 1 (Elk Hills) and 2 (Buena Vista Hills)	\$164.19	\$126.59	<b>\$132.00</b>	+4%
Reserve No. 3 (Teapot Dome)	12.87	15.60	<b>8.40</b>	-46%
Naval Oil Shale Reserves	2.30	0	<b>1.40</b>	
Program Direction	7.63	6.60	<b>7.70</b>	+17%
Total	\$186.99	\$148.79	<b>\$149.50</b>	+1%

## CONCLUSION

The Office of Fossil Energy has made many difficult but necessary decisions in developing its FY 1997 budget. While it meets Congressional guidance in terms of fiscal constraint, appropriateness of the Federal role, and management streamlining, this budget proposal should continue to be seen as a transition:

- In the R&D program, we are transitioning from an engineering-dominated program to a more fundamental, core science and technology program. Planning is underway to define this core program for the post-2000 timeframe. Meanwhile, it is important that we continue to capture the benefits of investments made to date in technologies that are only 2-4 years away from realizing their R&D goals.
- In the Clean Coal Technology Program, we are entering the final phase of federal funding. Most of the early projects have completed their demonstration phase; several of the more recent, larger scale projects are in construction or operations. The Federal role soon will be concentrated solely on monitoring the Federal investment and ensuring that the Nation benefits to the greatest extent possible from these first-of-a-kind technologies.
- The Strategic Petroleum Reserve continues in transition from an emphasis on building a sufficient oil stockpile to a maintenance and operational mode, ensuring that the Nation's "oil insurance policy" remains readily available for use well into the next century; and
- The Naval Petroleum and Oil Shale Reserves are in transition from government-run assets to privately-owned and operated properties, assuming that the market places sufficient value on the fields.

These transitions are bringing profound changes to the way the Office of Fossil Energy looks and operates. The commitment of both the Congress and the Administration to proceed with this transition in the most rational and responsible manner possible is critical if we are to maintain a focused, efficient, and effective Fossil Energy program that truly benefits this Nation.

We look forward to writing this new chapter for Fossil Energy in collaboration with this subcommittee.

Mr. Chairman, that completes my prepared statement.